Regulatory Impact Analysis: Relief from Regulatory Requirements for Storage and Disposal of Mixed Waste

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SECTION 1: BACKGROUND INFORMATION

1.1 Purpose of this Document

EPA is proposing to revise regulations on management of mixed wastes under the Resource Conservation and Recovery Act (RCRA). The revisions are intended to reform RCRA regulation of these wastes that is duplicative of regulations under the Atomic Energy Act (AEA).

In accordance with Executive Order 12866, "Regulatory Planning and Review," this document provides a statement of the rationale for this regulatory action, an analysis of the social costs and benefits associated with the action, and a review of possible economic impacts which could result from implementation of this regulation.

1.2 Purpose of the Rulemaking

Handling of mixed wastes is currently regulated by the Nuclear Regulatory Commission (NRC) under the Atomic Energy Act, as well as the Environmental Protection Agency under the Resource Conservation and Recovery Act. Those who generate, manage, and dispose of these wastes must comply with both sets of regulations.

Some generators who attempt to satisfy requirements of both their NRC license and the RCRA regulations experience conflicts and difficulties in compliance. In some cases, RCRA regulations have made it more difficult to comply with NRC requirements or objectives. For example, RCRA restrictions on waste disposal have limited or even eliminated treatment and disposal options for a subset of these mixed wastes. The inability to dispose has compelled generators to store wastes on site (exceeding the allowable period for storage of hazardous waste), rather than sending wastes for disposal in secure low-level radioactive waste disposal facilities. To some extent, this problem has been alleviated by a temporary EPA enforcement policy.[2] Under this policy, EPA is treating violations of RCRA storage requirements (for this subset of wastes) as a reduced priority for civil enforcement actions. EPA regards this policy as an inferior option to a policy which would facilitate safe treatment and disposal of mixed wastes.

EPA has concluded that mixed wastes can be managed in a safe manner that may reduce costs of waste management, if certain RCRA regulations are revised. This regulatory reform can provide more cost-effective waste management and certain environmental improvements at the same time.

The purpose of this rulemaking is to reduce redundant burdens caused by this dual regulation of mixed wastes.

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[2] Originally promulgated on August 29, 1991, and extended on November 6, 1998. See 63FR 5998 for details.

1.3 Current Regulations on Mixed Waste

Mixed wastes are wastes that contain both a hazardous waste and radioactive material subject to the Atomic Energy Act of 1954, as amended. A hazardous waste is either listed under 40 CFR Part 261, Subpart D, and/or exhibits a characteristic described in 40 CFR Part 261, Subpart C. A radioactive waste is generally classified as source, special nuclear, or byproduct material, which is exempt from the definition of solid waste at § 261.4(a)(4) (51 FR 24504; July 3, 1986).

Radioactive wastes are generally categorized according to the process that creates them. Mixed wastes generally fall into one of three radioactive waste categories: high-level waste (processed spent fuel and irradiated targets); transuranic waste (containing man-made elements heavier than uranium); or low-level waste.

"Low-level" wastes (as defined in the Low-level Radioactive Waste Policy Amendments of 1985) include radioactive materials that are not high-level waste (processed spent fuel and irradiated targets); spent nuclear fuel, or by-product materials (mill tailings or waste). These wastes are generally categorized as Class A, B, or C, where Class A wastes have lower levels of radioactivity than Class B or C waste (most LLW is Class A waste). Low level waste is managed under the Atomic Energy Act of 1954, either under auspices of the Department of Energy (for its own facilities) or the NRC or NRC agreement states (for other government, commercial, industrial, and research facilities).

This proposed rule refers to low-level mixed waste, wastes that contain both hazardous waste and low-level radioactive waste (but not high-level or transuranic waste); this analysis refers to this type of waste as "mixed waste" or LLMW. This rule does not apply to LLMW in the form of wastewaters.

Storage

Under RCRA, generators may store their hazardous wastes on site for limited duration without a permit. With a permit, the facility may store hazardous wastes for longer periods, but only as needed to accumulate sufficient quantities for recovery, treatment or disposal.[3] Because of the limited treatment and disposal capacity available for mixed wastes, some generators are in violation of this requirement. As a result, in 1992 EPA promulgated its reduced enforcement priority strategy, which has since been extended through October2001. Under this strategy, facilities storing mixed waste in excess of regulatorily limited time periods (due to a lack of treatment or disposal capacity) are a low priority for civil enforcement actions as long as the waste is managed responsibly. This EPA enforcement strategy applies primarily to mixed wastes generated by commercial facilities and Federal facilities licensed by the NRC. Mixed wastes stored by the Department of Energy (DOE) were subject to Site Treatment Plans required as a result of the Federal Facilities Compliance Act (FFCA) of 1992.

[3] Wastes placed in storage prior to promulgation of the relevant Land Disposal Restrictions are not subject to these storage restrictions. Land Disposal Restrictions for mixed wastes were promulgated in 1990.

In addition to RCRA regulations, commercial facilities must be licensed by NRC (or an NRC agreement state) to store radioactive materials. Specific requirements vary depending on the type of facility and nature of the waste. For example, NRC generally requires that its licensees store low level wastes in containers with shielding (such as concrete or lead) as necessary to minimize exposure to the radioactivity.

Treatment

Under RCRA, hazardous wastes may not be land disposed unless they meet requirements established under EPA's Land Disposal Restrictions (LDR) program. These requirements vary depending on the specific waste type as indicated by the hazardous waste codes assigned to the waste stream. For most wastes, requirements are expressed as maximum allowable concentrations of individual contaminants in the waste. EPA derived these concentrations from data on the levels achievable when applying the best demonstrated and available treatment technology. However, generators need not treat the waste if constituent concentrations (in untreated waste) are below the standards and may apply types of treatment other than those used to establish the standards. For some wastes, the standards are expressed as mandated treatment technologies (rather than allowable concentrations), in which case that treatment is required prior to land disposal. Although the standards apply to both wastewaters and nonwastewaters, wastewaters are usually discharged under Clean Water Act permits rather than land disposed under RCRA.

EPA established land disposal standards for most mixed wastes in 1990. In general, these standards are identical to those applied to hazardous wastes carrying the same waste codes. However, EPA also established the following specific standards for four mixed waste categories: (1) vitrification for HLMW resulting from reprocessing spent nuclear fuel; (2) macrocapsulation for lead solids; (3) amalgamation for elemental mercury; and (4) incineration for mercury-containing hydraulic oils.

Disposal

Under RCRA, disposal requirements vary depending on the type of waste. Listed hazardous wastes, after meeting LDRs, must be disposed in facilities permitted under Subtitle C of RCRA. Subtitle C establishes several types of requirements for locating, designing, and operating these facilities. Characteristic wastes may be disposed in facilities designed for non-hazardous wastes if the wastes: (1) meet the LDR requirements, and (2) have been treated to remove the characteristic. Non-hazardous waste sites are governed by Subtitle D of RCRA and are subject to relatively few existing federal requirements, but may be more extensively regulated by the state in which they are located.

Low-level mixed wastes meeting LDR requirements must currently be disposed in facilities that meet both the requirements of RCRA for hazardous wastes and of AEA for radioactive waste. LLMW from DOE is generally disposed at selected DOE or commercial sites, and LLMW generated by NRC licensees will be disposed at commercial facilities. Only one commercial facility (Envirocare in Utah) currently accepts mixed wastes for disposal.

1.4 Summary of the Proposed Rule

The proposed rule offers conditional exemptions[4] from some RCRA requirements for storage , treatment, and disposal of mixed wastes. These exemptions are summarized below; for a full description of the requirements and conditions for the exemptions, see today's preamble and proposed regulatory language.

Storage and Treatment

EPA is proposing to allow generators of low-level mixed waste to claim a conditional exemption from the definition of hazardous waste for stored mixed wastes which are managed under an NRC license[5] and meet EPA conditions for the exemption. Storage of LLMW that is conditionally exempt would not require a RCRA permit. During the storage period, the generator will be allowed to treat the conditionally exempt waste in a tank or container to enable neutralization, solidification, or other stabilization of the hazardous portion of the waste.

Disposal

EPA is also proposing that mixed wastes be eligible for a conditional exemption from the definition of hazardous waste after meeting LDR levels, but only when the wastes are disposed at an NRC-licensed low-level radioactive waste disposal facility (LLRWDF), and other applicable conditions are met. Under this exemption, the claimant (i.e., a generator or treater) would remain subject to the applicable land disposal restriction (LDR) treatment standards and must notify regulatory agencies, as specified, of the intended disposal. The LLMW would be exempted from RCRA hazardous waste disposal regulations once the LLMW is placed on the truck immediately destined for disposal at a NRC-licensed LLRWDF. The RCRA-exempted LLMW could be then transported as a strictly low-level radioactive waste, using an NRC manifest.

Alternative Regulatory Option

EPA is considering an alternative to this proposal, which would involve granting site-specific variances based on risk assessments. Since this alternative would be defined on a site-by-site basis, this Regulatory Impact Analysis does not assess costs and benefits that could be associated with such a regulatory regime.

1.5 Summary of Costs and Benefits

We anticipate that implementation of this rule will result in incremental benefits (from cost savings and risk reductions) and some incremental costs. These costs are expected to be much smaller than the benefits of the rule overall. The cost-benefit analysis and economic impact analysis of this proposed rulemaking are detailed in section 4; this section is just an overview of these topics.

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[4]See proposed regulatory language in §266.210 through §266.385 for complete descriptions of the conditions and requirements.

[5] All references in this document to NRC licensing are also intended to include licensing by an NRC agreement state.

Significant uncertainties make it unusually difficult to estimate the impacts of this rulemaking. In addition to uncertainties about the quantities of LLMW generated in the US, there are also questions about the eventual disposition of these wastes. Although this rulemaking creates opportunities for disposal of much of this waste, these opportunities also depend on as-yet undetermined action by State regulatory agencies, LLRW disposal facilities, and the generators themselves. We have based our assessment on the best data available; full references to assumptions behind these estimates and their uncertainties appear later in this document[2]. We have also based our assessment on assumptions that generators will be willing and able to dispose of their waste in LLRWDFs, within the scope of existing limitations on capacity and acceptance criteria.

These uncertainties and assumptions, however, do not affect the Agency's assessment of positive net benefits stemming from this rule; they only affect the magnitude of that net benefit. Overall, quantified net benefits from this rule are estimated to range between $900,000 and $3.6 million annually. Over twenty years, total cost savings range between $14.7 million and $58.9 million. *These estimates represent only a portion of the total net benefits; other benefits remain unquantified.*

Benefits

- Permitting cost savings: Those generators needing RCRA permits only for the sake of storage or treatment of their mixed wastes will save these permitting costs and corrective action costs associated with the permitting process;

- Decay in Storage: Savings in treatment and disposal costs for these wastes (see section 4.1) are expected to total between $13 million and $42 million over 20 years.

- Other Disposal Cost Savings: Savings in disposal costs for all commercial (NRC-regulated) wastes are expected to total between $0.8 million and $16 million over 20 years. In addition, the Department of Energy could save approximately 12 million dollars annually on disposal fees, if it chose to take advantage of these exemptions.

- Administrative Cost Savings: Both generators of mixed waste and Federal/state RCRA regulating agencies are expected to save burden and costs because of this regulatory relief.

- Risk Reductions: This regulatory reform is expected to result in reduced exposure to radioactive wastes, as well as facilitate increased treatment and final disposal of mixed wastes.

[2] Assumptions are described in section 3.3; uncertainties in section 4.8.

Costs

- Implementation costs: Under this rule, administrative requirements to document the regulatory exemptions will result in some increased costs to RCRA regulatory agencies administering the conditional exemption for mixed wastes. We expect these entities to incur costs associated with notification conditions for generators/treaters of LLMW claiming the exemption, and related implementation costs. This will result in a small increase in costs for these agencies. We note that as a whole, costs to RCRA regulatory agencies are likely to be far lower, since these agencies will have reduced administrative costs as noted in the "Benefits" section above.

1.6 Economic Impacts

By allowing LLMW to be disposed as low-level radioactive waste (LLW), this rule may have impacts on the national market for disposal of LLW, although we have not specifically modeled these impacts. The larger the volume to be added to the disposal market, the greater the effects are likely to be. The largest volumes of LLMW potentially to be disposed at commercial LLRWDFs are those generated by the Department of Energy, including wastes from site cleanup/remediation activities.

Overall, we expect cost savings to yield strongly positive economic impacts for all LLMW generators, LLW disposal facilities, and regulating agencies.

SECTION 2: GENERATION AND MANAGEMENT OF LOW-LEVEL WASTE AND MIXED WASTE

To understand the impacts of proposed regulatory changes, EPA analyzed available data sources to estimate the quantities of mixed waste that are generated, and quantities of mixed waste that are likely to be affected by this proposed rule. This section explains the results of this analysis, and explains existing techniques for managing low-level radioactive waste and low-level mixed waste.

2.1 Generation of Mixed Low-Level Waste

Wastes Generated by the Department of Energy

The Department of Energy (DOE) generally is the largest generator of mixed wastes. The rate of generation of mixed waste by DOE is highly variable, since a great deal of it is a result of remediation projects. Most major DOE facilities are committed by compliance orders to specific plans for treating mixed wastes under the Site Treatment Plans required by the FFCA. These plans are approved and enforced by EPA or by RCRA-authorized states. Therefore, DOE has been excluded from the storage exemption in this proposed rulemaking.

The disposal exemption, on the other hand, may have an impact on DOE wastes. DOE can take advantage of this exemption, however, only if the department meets the conditions, including transporting wastes under NRC manifest and disposing of wastes at NRC-licensed facilities.

The department announced in 1999 that

> ...DOE will continue its policy of disposing its LLW and LLMW at the site at which it is generated, if practical, or if on-site disposal is not available, at another DOE disposal facility. DOE may approve exemptions from this policy.[3]

Given those plans, it is difficult for EPA to estimate the extent to which DOE might take advantage of this proposed rulemaking. Therefore, this analysis cannot reasonably assess the impacts of the disposal exemptions on DOE wastes. Some possibilities are discussed in Appendix A.

Wastes Generated by NRC Licensees

Given the difficulty in assessing impacts on DOE wastes, this analysis focuses on wastes managed by facilities regulated by the NRC. In 1990, EPA and the US Nuclear Regulatory Commission (NRC)

[3]James Owendoff, Acting Assistant Secretary for Environmental Management, *Draft DOE Manual Requirements on Use of Non-DOE Facilities for Low-Level Waste and Mixed Low-Level Waste Disposal*, 10 March 1999.

jointly sponsored a study of the volumes, characteristics, and management of LLMW regulated by the NRC[4]. The study examined generation of mixed waste in

- industrial and commercial enterprises
- medical uses
- universities, and
- non-DOE government research (e.g., National Institutes of Health)

This *National Profile* survey report estimated that approximately 137,122 cubic feet of low-level mixed waste were generated in 1990, and 68,773 cubic feet of LLMW remained in storage as of December 31, 1990.[5] This waste was generated by approximately 980 facilities within these sectors.

To understand the quantities of waste that might be affected by this proposed rulemaking, EPA further refined these estimates, as summarized in Table 1.

- *Non-RCRA Wastes:* The survey form instructed respondents to include certain waste streams which are not regulated under RCRA. This analysis assumes that all the waste streams without RCRA codes are not RCRA-regulated, and thus not affected by this rulemaking. This quantity of waste (29,000 cubic feet in "annual generation", and 12,700 "in storage") is assumed not to be affected by the rule.

- *Double-Counted Wastes:* Since storage is reported at year-end, the figures reported may include wastes in short-term storage (prior to treatment or disposal) as well as wastes stored indefinitely due to the lack of treatment or disposal capacity. To ensure that "wastes in storage" are only those wastes which are in long-term storage because of lack of treatment capacity, this analysis makes further adjustments. Wastes that are likely to be stored for a limited time period (i.e., wastes that can be treated and disposed) are assumed to be double-counted, and therefore removed from the storage category. A total of 51,700 cubic feet of wastes are removed from the "storage" counts.

Based on those assessments, EPA believes that there are approximately 4,400 cubic feet of mixed waste in storage, and 108,100 cubic feet of mixed waste generated annually. <u>All of this quantity would be affected by the storage exemption</u>. To determine the quantities of waste that would be affected by the disposal exemption, further adjustments are made to those totals:

- *Decay in Storage:* With certain restrictions, the NRC allows its licensees to allow certain wastes to undergo a process known as "decay-in-storage" (see section 4.1 for more detail on these wastes). After promulgation of this rulemaking, EPA anticipates that these wastes would be disposed as hazardous wastes, not mixed

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[4]Oak Ridge National Laboratory, *National Profile on Commercially Generated Low-Level Radioactive Mixed Waste* (1992).

[5] Throughout this analysis, data reported in cubic meters has been converted to cubic feet using a conversion factor of 35.3 cubic feet per cubic meter.

wastes. See section 4.1 for more information on these wastes, and cost savings this rule would bring for these wastes. Approximately 1,900 cubic feet of wastes would be decayed in this fashion.

- *Characteristic Wastes*: The disposal exemption primarily affects listed mixed waste, because characteristic mixed wastes may be disposed as low-level wastes once treated to both meet the LDRs and remove the hazardous characteristic.[6] Approximately 4,000 cubic feet of the waste in storage is characteristic only, and approximately 22,400 cubic feet of the annual generation.

- *Untreatable Wastes*: The disposal exemption will only affect wastes which can be treated and disposed. Most listed LLMW reported in the *National Profile* as annual generation is likely to be treatable, given the technologies and capacity now available. Approximately 400 cubic feet of the waste in storage, and 4,200 cubic feet of annually generated waste may be untreatable[7], and thus unaffected by the disposal exemption.

All but 400 cubic feet of the 34,600 cubic feet in storage is only hazardous because of a characteristic. This waste is assumed to be in long-term storage because there is no capacity available for treatment. Although a small volume in the aggregate, even minuscule quantities of untreatable (or undisposable) waste can require a generator to undergo the permitting process as a RCRA storage facility.

EPA concludes that approximately 112,500 cubic feet of waste will be affected by the storage exemption, and 79,600 cubic feet will be affected by the disposal exemption. These numbers represent gross estimates, because of the significant uncertainties in the data. The volumes are based on the extrapolated survey data from the *National Profile*, which is already 10 years old and likely outdated. See the discussion on uncertainties in section 4.7 for further clarification on this data.

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[6] In some cases, the LDR standards are higher (less stringent) than the characteristic level. In these case, generators could choose to treat the wastes only to meet the LDR standard, then gain the exemption under these proposed regulations rather than by removing the characteristic. There is only a small group of wastes which fits this description, and this analysis does not address them.

[7] ICF, Inc. *Characterization and Management of Low-Level Mixed Waste Generated by Non-Weapons Related Facilities*(1998), pages 84 - 87, and Table 3-5. ICF reports that 3,417 cubic feet of listed wastes categorized as annual generation may be untreatable, which is significantly greater than the untreatable amount of listed waste reported in storage at the end of the year. We are uncertain about the reason for this inconsistency; it may indicate that a significant proportion of untreatable wastes are sent off-site for storage. The impacts of this uncertainty on our analysis are discussed later in this memorandum.

Table 1: Assessing Volumes of Wastes Affected		
Category of wastes	Volume in storage (cu. ft.)	Volume of annual generation (cu. ft.)
Total volumes reported in the National Profile	68,800	137,100
minus Non-RCRA wastes	(12,700)	(29,000)
minus Double-counted wastes	(51,700)	
Adjusted Volume of Mixed Wastes Managed (all affected by storage exemption)	**4,400**	**108,100**
minus Wastes eligible for decay in storage		(1,900)
minus Wastes carrying only characteristic codes	(4,000)	(22,400)
Wastes with no treatment options	(400)	(4,200)
Annual wastes affected by disposal exemption	**0**	**79,600**

How much waste would actually need disposal? Although the National Profile requested data on post-treatment quantities, many respondents did not provide this information.[8] Where these data are missing, post-treatment quantities of waste are estimated by applying an average ratio of pre-treatment to post-treatment volume, based on the reported data.[9] According to this technique, the estimated post-treatment volume of wastes for disposal would be approximately 11,300 cubic feet.

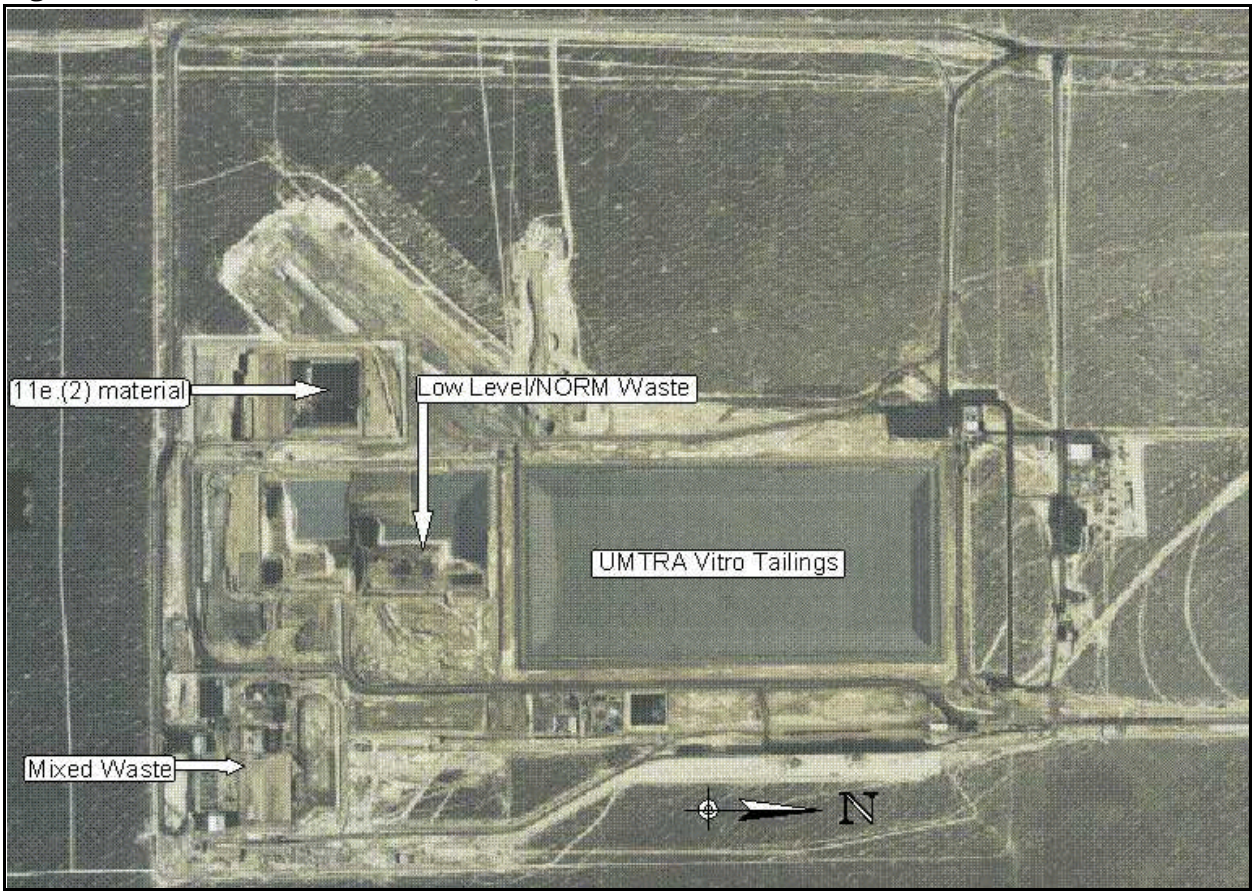
[8] For waste streams missing data on treatment (but not identified as untreatable), the lack of data on post-treatment quantities could indicate that: (1) the waste meets the LDR standards without treatment; (2) the waste was treated but the data were not reported; or (3) the waste was not treated due to the lack of LLMW disposal capacity rather than treatment constraints. However, we cannot determine the actual status of these wastes based on the available data.

[9] On average, post-treatment quantities in the *National Profile* are about 14 percent of pre-treatment quantities. We assume that these post-treatment quantities are non-wastewaters; i.e., that the treatment removes liquids from wastes originally reported as wastewaters.

2.2 Management of Mixed Wastes

At present, there is only one dually-permitted facility for disposing of mixed wastes — Envirocare of Utah (Figure 1). No other commercial facility can legally accept mixed wastes for disposal. Envirocare's license allows them to accept only Class A low-level or mixed waste, with limits on radioactivity concentration levels for individual isotopes and for shipments overall.[10] In addition, Envirocare can accept mixed waste containing any RCRA listed waste codes except F020, F021, F022, F023, F026, F027. The *National Profile* does not include any LLMW carrying these codes.

Figure 1: *Envirocare of Utah waste disposal site* Photo from Utah Dept of Environmental Quality



The Northwest Compact (within which Envirocare is located)[11] also establishes limits on the mixed wastes accepted by Envirocare, and in the past allowed them to accept only wastes that were both

[10] These limitations are spelled out in Envirocare's license, available from the state regulatory agency at http://www.deq.state.ut.us/eqrad/drc_lows.htm

[11] See section 3 for a description of the compact system.

high volume (over 1,000 cubic feet), and from states outside the compact. However, these limits were removed in November 1998.[12]

Commercial mixed wastes which do not meet Envirocare's license criteria cannot otherwise be legally disposed. Estimates of which mixed wastes can be disposed of at Envirocare are presented in Section 3.

2.3 Management of Low-Level Radioactive Waste

In 1985, Congress amended the Low-Level Radioactive Waste Policy Act, originally passed in 1980. This statute made each state responsible for ensuring that disposal capacity is available for low-level radioactive waste generated within that state. The act also encouraged groups of states to jointly and cooperatively develop disposal capacity.

In response, several states have joined into "compacts," reflecting agreements that one designated state will host a facility which will receive LLRW for all the states in the compact. The states and their compacts (if any) are listed in Table 2.

At present, there are three sites which accept commercial low-level radioactive waste for disposal:

- Envirocare of Utah (which has a LLW cell in addition to its LLMW cell);
- Chem-Nuclear, Inc. at Barnwell, South Carolina
- US Ecology, at Richland, Washington.

The Richland location is the designated site for the Northwest compact; the other two sites are not associated with compacts. The types of wastes that each of these sites accept are limited by the terms of their NRC licenses and the decisions of the compacts and individual states. A simplified version of the acceptance criteria is as follows:[13]

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[12] Northwest Interstate Compact on Low-level Radioactive Waste Management, *Second Amended Resolution and Order,* November 9, 1998. (www.deq.state.ut.us); and, personal communication with William Sinclair, Director, Division of Radiation Control, State of Utah, May 18, 1999.

[13] Further information on acceptance criteria can be found in the following sources:
Low-Level Radioactive Waste Forum, "Low-Level Radioactive Waste Management Summary Report" Vol. 7, No. 1, January 1999 (www.afton.com/llwforum)
Richland — U.S. Ecology, Inc. Radioactive Material License No. WN-I019-2, Amendment No. 25, expiration date of May 31, 1997, under timely renewal. (www.americanecology.com)
Barnwell — Chem-Nuclear Systems, Radioactive Material License No. 097, Amendment No. 47, July 31, 2000 expiration date. (www.chemnuclear.com)
Envirocare — Envirocare Radioactive Material License No. UT 2300249, Amendment No. 01, expiration date of Oct. 22, 2003. (www.envirocareutah.com); Northwest Interstate Compact on Low-level Radioactive Waste Management, Second Amended Resolution and Order, November 9, 1998. (www.deq.state.ut.us)

Table 2 COMPACT MEMBERSHIP	
Appalachian Compact	Delaware, Maryland, Pennsylvania, West Virginia
Central Compact	Arkansas, Kansas, Louisiana, Nebraska*, Oklahoma
Central Midwest Compact	Illinois, Kentucky
Midwest Compact	Indiana, Iowa, Minnesota, Missouri, Ohio, Wisconsin
Northeast Compact	Connecticut, New Jersey
Northwest Compact	Alaska, Hawaii, Idaho, Montana, Oregon, Utah, Washington, Wyoming
Rocky Mountain Compact	Colorado, Nevada, New Mexico
Southeast Compact	Alabama, Florida, Georgia, Mississippi, North Carolina, Tennessee, Virginia
Southwestern Compact	Arizona, California, North Dakota, South Dakota
Texas Compact	Maine, Texas, Vermont
Unaffiliated States	District of Columbia, Massachusetts, Michigan, New Hampshire, New York, Puerto Rico, Rhode Island, South Carolina
Source: Afton Associates, Incorporated, *Low-Level Radioactive Waste Management Summary Report*, Vol. 7, No. 1, January 1999 (www.afton.com/llwforum). *Nebraska has since left the Central Compact.	

Richland:

- Accepts Class A, B, and C wastes
- Accepts only waste from Northwest compact and Rocky Mountain compact .[14]
- Limitations on radioactivity levels and other requirements

[14] While the intent of the Compacts is to base waste acceptance on the state where the waste is generated, such attribution can be difficult for wastes processed by waste storage or treatment facilities. Waste managers and regulators indicate that some wastes are disposed based on the location of the storage or treatment facility rather than the originating sites. See, for example, Afton Associates, Incorporated, "Waste Attribution After Processing: Whose Atom is It?" *Low-level Waste Forum Meeting Report — February 9-12 ,1999*, page 6. (www.aftonassoc.com/llwforum)

Barnwell:

- Accepts Class A, B, and C wastes
- Accepts waste from all states except Northwest and Rocky Mountain compacts, and North Carolina.
- Limitations on radioactivity levels and other requirements

Envirocare:

- Accepts no Class B or C waste; accepts Class A wastes below certain radioactivity levels
- Accepts waste from all states except those in the Northwest and Rocky Mountain compacts

SECTION 3: CHARACTERIZATION OF BASELINE AND POST-REGULATORY SCENARIOS

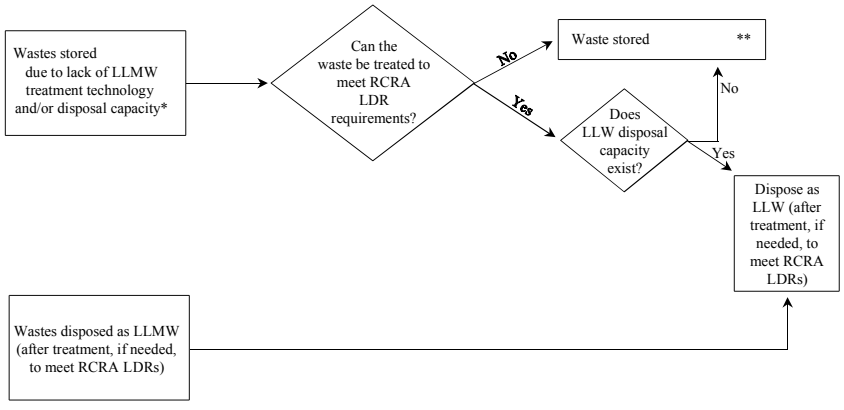
EPA's draft guidance for economic analysis specifies the rationale for selection of baseline and post-regulatory scenarios:

> An economic analysis of a policy or regulation compares "the world with the policy or regulation" (the policy scenario) with "the world absent the policy or regulation" (the baseline scenario). Impacts of policies or regulations are measured by the resulting differences between these two scenarios. [15]

The next step in the analysis is an assessment of scenarios for comparison: how mixed waste would be managed in the absence of the rulemaking (the baseline scenario), and how it would be managed if the rule were promulgated (the post-regulatory scenario). Figure 2 explains EPA's overview of the projected flow of wastes in the baseline and post-regulatory scenarios. The scenarios are described in detail below.

Figure 2

OVERVIEW OF BASELINE AND POST-REGULATORY STATUS



* Under the baseline, NRC-licensed facilities currently storing wastes indefinitely would need to aave RCRA permits or send wastes to a permitted storage, treatment, or disposal facility that can accept MLLW.

** Under the post-regulatory scenario, NRC-licensed facilities could store these wastes indefinitely without a RCRA permit.

[15] U.S. EPA, *Guidelines for Preparing Economic Analyses*, Draft, May 1999. Chapter 5.

3.1 Baseline Scenario

For this analysis, the baseline scenario describes management of mixed wastes in the absence of this rulemaking. The baseline scenario begins with the expiration of the Agency's special enforcement policy (see Section 1) in November, 2001.

Generation of wastes in the starting baseline year are assumed to be the same as for 1990, approximately 108,000 cubic feet annually; this leads to approximately 11,300 cubic feet of wastes to be disposed (see section 2.1). EPA believes that this is may be an overestimate, since there is some information indicating that generators have implemented waste minimization measures. A 1998 report from the Electric Power Research Institute[16] suggests that annual generation of mixed wastes in the electric power industry has decreased significantly since 1990.[17]

In the baseline scenario, mixed wastes are subject to RCRA requirements on disposal of hazardous wastes; i.e, they can only be disposed of at facilities that are both permitted under RCRA for hazardous waste disposal and licensed by the NRC for LLW disposal. Wastes which are likely to be treated and disposed under baseline scenario are those wastes which meet LDR treatment standards and can be accepted by Envirocare.

There are two possible situations which could be realistically projected regarding disposal of mixed wastes in the baseline scenario.

A) The options for mixed waste disposal remain the same as in 1999: Only one facility (Envirocare of Utah) is both licensed (under AEA) and permitted (under RCRA) to dispose of mixed waste. Given the restrictions placed on Envirocare (see §2.2), only a portion of the total volume of volume of waste can be disposed. Of 11,300 cubic feet of residuals to be disposed, EPA estimates that between 4,400 and 11,200 cubic feet (39% - 99%) could go to Envirocare[18]. The remaining amount (between 100 and 7,000 cubic feet) would remain in long-term storage without a legal disposal option. Such storage would violate RCRA LDRs, and would leave the facility subject to enforcement actions and penalties.

B) There are more options for mixed waste disposal in 2001 than in 1999. This projection assumes that the expiration of the Agency's enforcement policy provides a stronger impetus to disposal of mixed wastes. This shift in demand for waste disposal services, in turn, could provide enough incentive for the market to provide additional capacity for disposal of mixed waste.

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[16] Roy F. Weston, et. al., *Evaluation of Commercial Low-Level Mixed Waste Contingent Management Options — Database of LLMW Quantities, Sources, and Characteristics*, June 1998.

[17] See "Draft Analysis of RCRA Exemption for Mixed Waste: Addendum I", Memo from Industrial Economics, Inc., to Glenn Farber, EPA, June 9, 1999.

[18] For the analysis which derives these percentages, see "Draft Analysis of RCRA Exemptions for Mixed Waste: Addendum 2", Memorandum from Industrial Economics, Inc. to Glenn Farber, EPA, June 10, 1999. Note that the volume of mixed waste that could be disposed at Envirocare could change over time, as the degree of radioactivity changes in waste streams.

This analysis assumes that these are both within the range of possibilities — either Envirocare remains the sole option for disposal of mixed wastes, or other options become available. Therefore, in the baseline scenario, there is assumed to be disposal capacity for between 39% and 100% of mixed waste.

Generally, RCRA permits are required for storage of hazardous waste for periods longer than regulatory limits, and long term storage is allowed only while the facility is accumulating amounts sufficient for effective recovery, treatment, or disposal.[19] Anecdotal information and analysis of the *National Profile* database suggests that some facilities are currently storing mixed wastes longer than RCRA regulations would allow, owing to difficulties in treating and disposing of the wastes. This analysis estimates that approximately 35,000 cubic feet of mixed wastes are in storage at the beginning of the period of the baseline scenario (as described in Section 2). In the baseline scenario, mixed wastes are subject to all RCRA storage requirements as well as AEA requirements specified under the facility's NRC license. Therefore, in the baseline scenario, those mixed wastes without available treatment or disposal must be stored under a RCRA permit.

The estimated disposition of wastes in the baseline scenario is explained in Table 3 below.

Table 3: Projected disposition of mixed wastes in the baseline scenario

Type of mixed waste	Disposition in Baseline A	Disposition in Baseline B
Meets Envirocare criteria (4,400 - 11,200 cu. ft.)	Dispose at Envirocare as mixed waste	Dispose at Envirocare as mixed waste
Does not meet Envirocare criteria (100 - 6,900 cu. ft.)	Permitted/Licensed Storage (either on- or off-site)	Disposed at new LLMW disposal facility as mixed waste

3.2 Post-Regulatory Scenario

The post-regulatory scenario describes management of mixed wastes in the aftermath of the assumed promulgation of this rulemaking. The post-regulatory scenario, like the baseline scenario, begins with the expiration of the Agency's special enforcement policy (see section 1) in November, 2001. It assumes promulgation of the rulemaking at the same time. EPA believes that the combination of the expiration of EPA's special enforcement policy for these wastes and the simultaneous promulgation of this rulemaking will help facilitate movement of these wastes from on-site storage into appropriate long-term disposal facilities.

Assumed Disposition of Wastes

In the post regulatory scenario, there are no RCRA restrictions on storage of mixed wastes. In

[19] Wastes placed in storage prior to promulgation of the relevant Land Disposal Restrictions are not subject to these storage restrictions. Land Disposal Restrictions for mixed wastes were promulgated in 1990.

addition, mixed wastes that meet LDR levels are eligible for disposal at NRC-licensed low-level radioactive waste disposal facilities. Wastes which are likely to be treated and disposed under post-regulatory scenario are those wastes which (a) can meet LDR treatment standards, and (b) can be accepted by Envirocare, Barnwell, or Richland.

To project where wastes would be disposed, this analysis assumes

a) that acceptance criteria and waste disposal charges for the low-level waste disposal facilities remain the same as in 1999; and

b) that generators would choose the disposal option with the lowest costs, taking into account charges for transportation and treatment as well as disposal.[20] This means that LLW waste generated by facilities in the Rocky Mountain or Northwest Compacts may continue to be disposed as LLMW (in which case Envirocare can continue to accept them) since related costs will be lower than Richland LLW charges[21], and Envirocare cannot accept LLW from these two compacts. If this assumption is valid, then generators in these states may choose not to take advantage of this exemption.[22]

Disposition of Wastes in the Post-Regulatory Scenario

Table 4: Projected disposition of mixed wastes in the post-regulatory scenario

Type of mixed waste	Disposition in Post-Regulatory Scenario
Meets Envirocare criteria (4,400 - 11,200 cu ft)	Dispose at Envirocare as low-level waste
Does not meet Envirocare criteria (80 - 6,900 cu. ft.)	Dispose at Barnwell or Richland as LLW

3.3 Assumptions

A series of assumptions lies behind the assessment of the disposition of wastes in both scenarios. If actual implementation of this rulemaking did not occur as assumed, then the impacts of this rule would be very different than what is projected in this document.

1. *Wastes are either stored or treated and disposed*; no mixed wastes are exported.

2. *The relevant states adopt the regulation*. Where the regulating authority has been delegated to the State government, that State must adopt this proposed rule in order for the relief to take effect.

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[20] Although state location is reported for many of the sampled facilities, the sample design and sample weights allow for extrapolation only to the national level.

[21] See Section 4.2 for unit costs of disposal of LLW and LLMW.

[22] We are unable to estimate the proportion of mixed wastes generated by the Rocky Mountain and Northwest Compacts based on the available data.

If the State of South Carolina does not adopt the rule, then mixed wastes cannot go to the Barnwell facility. If the State of Washington does not adopt, then mixed wastes cannot go to the Richland facility.

3. *The LLRWDF facilities themselves choose to accept the exempted wastes* for disposal as low-level waste. Even if the State governments adopt this rule, the facilities may choose not to accept these wastes.

4: *There is sufficient incentive to treat and dispose* under the post-regulatory scenario. If storage is less expensive than treatment and disposal (very likely), facilities have an incentive to store the wastes on site. RCRA requirements to remove the waste within the storage time limit constitute a principal disincentive to long-term storage in lieu of disposal. In addition, the NRC enjoins license to have the wastes treated and disposed. Other incentives include the desire to avoid CERCLA liability, or insurance problems. These incentives must be strong enough to overcome the loss of the RCRA requirement to remove the mixed wastes within the regulatory time frame. If those incentives are insufficient, then this rule could create a strong <u>disincentive</u> to disposal.

5. *Other EPA rules have no effect on these wastes*: This analysis does not account for possible effects of another EPA rulemaking which could affect a specific subgroup of mixed wastes, the Proposed Rule for Land Disposal of Low-Activity Mixed Waste. It also does not account for the effects of EPA's Hazardous Waste Identification Rule (HWIR). Under HWIR, listed hazardous wastes (including mixed wastes) could gain exemption from RCRA Subtitle C disposal requirements if they contain constituent concentrations below risk-based exit levels. Because the HWIR proposal is not finalized, it would be very difficult to determine which (if any) mixed wastes would be affected by the HWIR rulemaking. For purposes of this analysis, therefore, the HWIR rulemaking is assumed to have no effect on generation or management of mixed wastes.

SECTION 4: ASSESSMENT OF BENEFITS AND COSTS OF REGULATION

This section examines social costs and benefits expected to result from this rulemaking; these costs and benefits are measured from a national perspective. This section also briefly discusses economic impacts, including impacts on individual facilities and sectors.

This proposed rulemaking is expected to yield net benefits to society, owing to reduced waste management and administrative costs for both generators of mixed waste and regulatory agencies. Benefits associated with this rulemaking are expected to derive from two sources: cost savings and risk reductions.

Cost savings are associated with reduced costs of treating and disposing of wastes. Additional cost savings are likely to accrue from generators who will not need to go through the process of becoming permitted storage facilities under RCRA subtitle C. Risk reductions stem from reduced exposure to radiation, and facilitation of treatment and disposal of wastes. Table 5 summarizes costs and benefits associated with this proposed rulemaking; the remainder of this chapter provides a full explanation of these benefits and costs.

4.1 Cost Savings Associated with Decay-In-Storage Wastes

With certain restrictions, the NRC allows its licensees to allow wastes to undergo a process known as "decay-in-storage." This applies to certain materials with a physical half-life of less than 65 days. At the end of the designated holding period (at least 10 half-lives), the waste may disposed as a non-radioactive waste if the radiation emitted from the unshielded surface of the wastes is indistinguishable from background levels.[23]

Under the baseline scenario, wastes cannot be held for more than 90 days without a permit. In order for a mixed waste to decay in storage for 10 half-lives, it would need to have a half-life of 9 days or less. The *National Profile* shows no mixed wastes that meet this criterion. Therefore, no wastes in the baseline scenario would be allowed to decay in storage; they would need to be treated and disposed as mixed wastes.

[23] The regulations, including all requirements, are at 10 CFR 35.92

Table 5: Summary of Benefits and Costs	
BENEFITS	**COSTS**
Permitting cost savings *Decay in Storage*: Savings in treatment and disposal costs for these wastes are expected to total between $13 million and $42 million over 20 years. *Other Disposal Cost Savings*: Savings for NRC-regulated wastes are expected to total between $0.8 million and $16 million over 20 years. *Administrative Cost Savings*: Both generators of mixed waste and Federal/state RCRA regulating agencies are expected to save burden and costs because of this regulatory relief. *Risk Reductions* from reduced exposures	*Administrative costs*: Small implementation costs for generators who take advantage of the exemption, and for RCRA regulatory agencies.

Under the post-regulatory scenario, however, all mixed wastes meeting the NRC criteria could be allowed to decay in storage. After the decay period, listed wastes could then be treated and disposed as hazardous wastes; characteristic wastes could be decharacterized and disposed as non-hazardous wastes, at a Subtitle D non-hazardous waste disposal facility.

An analysis of the data from the *National Profile* shows that 124 waste streams contain radionuclides with half-lives less than 65 days.[18] The total volume of mixed waste that could decay in storage is 1,880 cubic feet.

Cost Savings[19]

In the baseline scenario, these 1,880 cubic feet are treated as mixed waste and disposed as mixed

[18] This analysis taken from "Draft Analysis of RCRA Exemptions for Mixed Waste: Addendum 3", Memorandum from Industrial Economics, Inc., to Glenn Farber, EPA, June 16, 1999.

[19] Cost calculations are derived in "Draft Analysis of RCRA Exemptions for Mixed Waste: Addendum 3" Memorandum from Industrial Economics, Inc. to Glenn Farber, EPA, 16 June, 1999.

waste, at a total cost of approximately $870,000. In the post-regulatory scenario, the wastes are treated as hazardous waste and disposed as either hazardous (listed wastes) or non-hazardous (decharacterized) wastes. The cost for treatment and disposal of these wastes in the post-regulatory scenario is approximately $92,000. The cost savings attributable to this rule would be approximately $785,000 per year.

NRC has approved license amendments for decay-in-storage for radionuclides with half-lives of up to 120 days. This would apply to an additional 4,322 cubic feet of mixed waste annually, with a cost savings of $2,600,000.

At a discount rate of 2%, the savings would accumulate to between $13,100,000 and $42,510,000 over a period of twenty years. At a discount rate of 7%, the net present value of the range would be $8,270,000 and $26,870,000.[20]

4.2 Other Disposal Cost Savings

Another anticipated source of cost savings stems from disposal of the exempted wastes as low-level radioactive wastes, rather than mixed wastes.

Low-Level Radioactive Wastes

Disposal costs for each LLW site vary, depending on the characteristics of the wastes and on business decisions made by individual waste management firms and the States or compacts that govern their operations. For each LLW disposal site, we develop cost estimates for disposal of a "typical" mixed waste stream, as described in Table 6[21].

Table 6

LOW-LEVEL WASTE DISPOSAL COST ESTIMATES

Facility	Cost (per cubic foot)
Barnwell	$400.00
Envirocare	$80.00
Richland	$290.00

Barnwell currently bases its prices on three factors: (1) a base price per pound that

[20] These two discount rates are among the highest and lowest rates discussed as options in U.S. EPA, *Guidelines for Preparing Economic Analyses*, Draft, May 1999, Chapter 6.

[21]They "typical" mixed waste stream as described in the *National Profile*. Unit cost estimates are derived in "Draft Analysis of RCRA Exemptions for Mixed Waste" Memorandum from Industrial Economics, Inc. to Glenn Farber, EPA, 27 May 1999.

decreases with increasing waste density; (2) a per pound multiplier based on radioactive dose rate; and (3) a curie surcharge based on total millicuries. Barnwell also charges an annual access fee that must be paid as a prerequisite for disposal.

To determine charges for disposal of a typical LLMW shipment (managed as LLW) at Barnwell, we estimated the characteristics of LLMW treatment residuals using data from the *National Profile* and from discussions with representatives of Diversified Scientific Services, Incorporated. Incinerator ash is used as the typical LLMW residual, because incineration is the predominant[22] treatment method for commercially-generated LLMW which contains organics. Based on typical characteristics, we estimate that Barnwell charges about $400 per cubic foot for disposal of LLMW treatment residuals.

For Envirocare, the estimate presented in Exhibit 8 was provided by Envirocare staff.[23] They indicate that typical costs for low level wastes are less than $80 per cubic foot, assuming the waste is similar in quantity and other characteristics to wastes usually received from NRC licensees.[24]

Richland's price consists of charges based on waste volume and radioactivity levels and charges per shipment and per container, as well as local taxes and fees. Based on similar assumptions regarding waste characteristics for Barnwell, we estimated a LLW disposal price of about $290 per cubic foot at the Richland facility.

Mixed Waste Disposal Cost Savings

Envirocare determines disposal costs for LLMW on a case-by-case basis and does not disclose its disposal prices. However, Envirocare staff indicate that the price per cubic foot for disposal of LLMW waste received from commercial generators is generally less than $100 per cubic foot, including all surcharges but excluding any costs associated with treatment.

One possibility examined for the baseline scenario assumed development of additional mixed waste disposal capacity, for wastes with radioactivity levels higher than those acceptable by Envirocare. To calculate cost savings, it was necessary to assume a price for such a hypothetical facility. Since the facility would need to be both RCRA-permitted and AEA-licensed, and

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[22] Approximately 85% of mixed waste streams in the *National Profile* go through this treatment.

[23] A similar estimate is reported in: U.S. Environmental Protection Agency, *Draft Regulatory Impact Analysis for 40 CFR Part 193: Proposed Rule for Land Disposal of Low-Activity Mixed Waste*, March 1999, page 5-7. Again, anecdotal evidence indicates that Envirocare's charges may be significantly higher for wastes that are atypical in terms of radioactivity, hazardous properties, or other factors.

[24] Generators who choose to take advantage of the exemption would need to containerize their waste, which is not currently required by Envirocare. This could be an additional cost for those generators who do not currently do so, but this analysis does not estimate those additional costs. EPA does not believe that containerization would represent significant additional costs.

competitive with facilities offering low-level waste disposal, EPA assumed a price to be 125% of the highest price for low-level waste disposal (Barnwell). The resulting assumed price is $500 per cubic foot.

Costs of Disposal, Baseline Scenario

The disposition of wastes in the post-regulatory scenario was projected in Section 3.1 Baseline A assumed new disposal capacity coming on line; Baseline B assumed no new capacity. Table 7 summarizes this disposition of wastes, and costs of disposal. The range of total disposal costs in baseline A: ($440,000 + $50,000) is between $500,000 - $4.6 million. The range of total disposal costs for baseline B is $440,000 - $1.1 million.

This range is highly sensitive to the assumption of new mixed waste disposal capacity. If there is no additional capacity, then all wastes which cannot be accepted at Envirocare remain in storage. If there is new capacity, these wastes incur costs of treatment and disposal.

Altogether, the range of total disposal costs for the baseline scenario is between $440,000 and $4.6 million. If there is no additional capacity, the upper limit of the range is down to 1.1 million.

Table 7:
Cost of Waste Disposal, Baseline Scenario

	Disposal method, Baseline B	Unit cost, Baseline B	Disposal method, Baseline A	Unit Cost, Baseline A	Total disposal cost, baseline B	Total disposal cost, baseline A
Envirocare wastes (4,400 - 11,200 cu. ft.)	Envirocare as LLMW	$100	Envirocare as LLMW	$100	$440,000 - 1,120,000	$440,000 - 1,120,000
non-Envirocare wastes (100 - 6900 cu ft)	New LLMW facility	$500	Wastes go to permitted storage facilities	-0- (costs incurred of either off-site storage or getting onsite RCRA permit)	$50,000 - 3,450,000	
Totals					$490,000 - $4.570,000	$440,000 - $1,120,000

Costs of Disposal, Post-Regulatory Scenario

The disposition of wastes in the post-regulatory scenario was projected in Section 3.2. Table 7 summarizes this disposition, and the associated costs of waste disposal. The range of disposal costs in the post-regulatory scenario is between $390,000 and $3.6 million.

Table 8: Costs of Waste Disposal, Post-Regulatory Scenario

	Disposal method	Quantity Disposed - low end (cu ft)	Quantity Disposed high end (cu ft)	Unit Cost	Total disposal cost, low end	Total disposal cost, high end
Envirocare wastes (4,400 - 11,200 cu ft)	Envirocare as LLW	4400	11,200	80	$352,000	$896,000
non-Envirocare wastes (100 - 6900 cu ft)	Barnwell as LLW (97%)	97	6,693	400	$38,800	$2,677,200
	Richland as LLW (3%)	3	207	290	$870	$60,030
Totals:					$392,000	$3,633,000

Cost Savings, Waste Disposal

Baseline annual disposal costs : $440,000 - $4.6 million.
Post-regulatory annual disposal costs: $390,000 to $3.6 million.

Disposal cost savings range from 50,000 - 1 million dollars per year. Again, the size of the range is highly sensitive to assumptions about new mixed waste disposal capacity in the baseline. If there is new LLMW capacity, then savings are closer to the million dollars. If there is no LLMW capacity, then savings are closer to the $50,000 end of the spectrum (but wastes remain in long-term storage).

Over a period of 20 years, disposal cost savings range from $820,000 to $16,350,000. This estimate uses a discount rate of 2%. At a discount rate of 7%, the savings range from $520,000 to $10,340,000.

4.3 Permitting Cost Savings

In the baseline scenario, facilities which have begun the permitting process may choose to continue

the permitting[25] process (and get a permit for storage), or simply send wastes off-site. Some mixed waste generators will choose to acquire RCRA part B permits as storage facilities. We assume that some proportion of these facilities would not have to get these permits in the post-regulatory scenario, since additional disposal capacity would allow them to move wastes off site within regulatory time limits.

For these facilities, cost savings include the cost of acquiring a permit, costs of corrective action, and costs of permit renewals.

4.4 Additional Cost Savings

Treatment Costs

In the post-regulatory scenario, mixed wastes would need to be treated to LDR standards to gain the exemption from Subtitle C. In the baseline scenario, mixed wastes that meet the toxicity characteristic (TC) would be treated not only to LDR standards, but also to decharacterize at TC levels. For some subset of these wastes (where the TC treatment level is lower than the LDR treatment level) there would be less extensive treatment in the post-regulatory scenario. This reduced treatment is another cost savings that could be anticipated from this rule.

Storage Costs

In the baseline scenario, mixed wastes are stored meeting requirements of both their AEA license and the RCRA permit. In the post-regulatory scenario, there is a savings of costs of compliance with the RCRA permit that are incremental to the costs of AEA compliance.

Transportation Costs

In the post-regulatory scenario, mixed wastes which have been treated to LDR levels are exempted from RCRA, and could be transported as low-level radioactive waste. In the baseline scenario, these wastes must be transported as mixed waste. EPA examined these costs, and concluded that transportation costs differences are not significant between the two types of waste.[26]

Administrative Costs

EPA expects cost savings to both generators and to Agency and State Implementors of this rule. Since these wastes will be exempt from RCRA requirements, there may be less need for enforcement actions against generators. To the extent that fewer facilities need permits, this also constitutes a reduction in burden to both generators and Agency/State regulators. Generators also save costs of manifesting exempted wastes under RCRA (although they still must be manifested for their NRC

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[25] Some mixed waste generators already are permitted for treatment or storage of mixed or hazardous wastes. This discussion of permitting costs refers to incremental permitting costs for facilities which only would need permits to deal with their mixed wastes.

[26] Detailed analysis of transportation costs is in "Draft Analysis of RCRA Exemptions for Mixed Waste: Addendum 4" Memorandum from Industrial Economics, Inc. to Glenn Farber, EPA, 10 June, 1999.

license). Finally, for those wastes which would not have a disposal option without this rule, generators will not face the liability of being in violation of RCRA. These cost savings are expected to be only slightly offset by administrative cost increases (see below).

4.5 Risk Reductions

Additional benefits that would result from this rule include reductions in risk to human health and the environment. These include:

Decay in Storage Wastes

As noted above, a certain set of wastes would be allowed to undergo decay in storage in the post-regulatory scenario. These wastes would remain in storage until their radioactivity levels are not distinguishable from background. Under the baseline scenario, these wastes must be treated and disposed while still radioactive. Therefore, workers are exposed to radiation during transport and treatment. This reduction in the handling of radioactive wastes in the post-regulatory scenario creates a certain reduction in exposure and risk.

Facilitating Treatment of Wastes

In the baseline scenario, a certain quantity of wastes (see section 2.1) cannot be disposed, and probably are not treated. By providing additional disposal capacity, this rule would facilitate treatment of these wastes for disposal. Although EPA believes that these wastes do not pose significant risk when stored under conditions specified in their AEA licenses, EPA associates some degree of risk reduction with the additional treatment of these wastes to meet LDRs and subsequent reduction in toxicity and/or mobility of hazardous constituents.

4.6 Additional Costs Associated with this Rule

Generators who choose to take advantage of these exemptions will incur some additional costs to gain the exemption, because of the notification requirements. Similarly, Agency and State regulators will also incur some additional costs to manage these exemptions and review the notification packages. EPA believes that these additional administrative costs are significantly smaller than the cost savings that the generators and regulators would receive as a result of this rule.

4.7 Economic Impacts of this Proposed Rule

By allowing LLMW to be disposed as LLW, this rule may have impacts on the national market for disposal of LLW, although we have not specifically modeled these impacts. The larger the volume to be added to the disposal market, the greater the effects are likely to be. The largest volumes of LLMW potentially to be disposed at commercial LLRWDFs are those generated by the Department of Energy, including wastes from site cleanup/remediation activities. These quantities have not been estimated for this analysis.

Overall, we expect cost savings to yield strongly positive economic impacts for all LLMW generators, LLW disposal facilities, and regulating agencies. Possible negative impacts include

- Impacts on the single mixed waste disposal facility which currently accepts some LLMW for disposal. By allowing LLRWDFs to dispose of the LLMW that meets Land Disposal Restrictions, this rule will introduce competition into the market for disposal of LLMW, where a monopoly

currently exists.

- Some generators may incur some increased spending for treatment and disposal for wastes which would not have treatment and disposal options in the absence of this rule. The impact on these facilities, however, needs to be seen in its legal context: without this rulemaking, these legacy wastes might simply continue to be stored on site indefinitely, leaving the generators in violation of RCRA permit requirements. By opening up disposal capacity, this rulemaking helps these facilities avoid the legal and financial burdens of being in violation of RCRA.

4.8 Uncertainties Associated with Cost Data

In addition to the assumptions enumerated in Section 3.3, uncertainties about the data used in this analysis can greatly affect the accuracy of the cost and benefit estimates. Significant uncertainties exist in the following categories:

Uncertainties related to Affected Waste Quantities

The National Profile data was collected at the same time that generators were adjusting their practices to reflect promulgation of the LDRs for mixed waste. These data therefore are not likely to reflect current waste storage, treatment, and disposal practices. In addition, EPA's proposal to facilitate disposal of certain low activity wastes at RCRA Subtitle C facilities may decrease the amount of wastes affected by the RCRA exemption for LLMW, depending on future regulatory actions by EPA and the NRC.

As discussed earlier , comparison of annual generation data to data on wastes in storage indicates that stored quantities may be understated, and the stored quantities do not include accumulation since 1990. To the extent that these wastes are untreatable, they cannot be disposed in either the baseline or post-regulatory scenario, so do not affect the analysis of disposal cost savings. However, savings in permitting and other costs may accrue for these wastes.

This analysis may overstate the quantities of wastes affected by the exemption because generators appear to have significantly decreased LLMW generation and storage since the time when the data on waste quantities was collected. There is also some information that industries have succeeded in reducing generation of wastes in response to pollution prevention concerns (see Section 3.1) On the other hand, the relevant industries: pharmaceuticals, biotechnology, and research, are all growing pursuits.

In the future, decommissioning operations at nuclear power plants may add additional quantities of mixed waste; however, such operations have not produced much LLMW to date.

Uncertainty in Disposal Costs and Acceptance Criteria.

LLMW and LLW acceptance criteria and costs are highly uncertain, due to frequent changes in the policies of the disposal sites, states and compacts. Envirocare policies and charges are particularly uncertain, given their reliance on case-by-case negotiations. The net effect of these factors on this analysis is unclear.

APPENDIX A: POTENTIAL IMPACTS ON THE DEPARTMENT OF ENERGY

APPENDIX A: POTENTIAL IMPACTS ON THE DEPARTMENT OF ENERGY

It is difficult to assess the possible impact of this proposed rule on activities of the Department of Energy, because of possible changes in the Department's strategy for managing mixed waste. It is feasible to estimate possible cost savings, however, based on current DOE use of the mixed waste disposal facility at Envirocare.

The Department reports disposing of 238,663 cubic feet of mixed waste at Envirocare during fiscal year 1996.[27] At $100 per cubic foot (a high estimate of Envirocare's mixed waste disposal charges, from Section 4.2), the approximate costs of disposal are $23.9 million. Were DOE to take advantage of this conditional exemption, the approximate cost of disposal of that waste as low-level waste would be $12 million (using the same assumption of Envirocare charges for low-level waste). The Department would save approximately $12 million (11,933,150) each year in waste disposal costs.

If DOE were to take advantage of the exemption, however, they would have to comply with the conditions and requirements of the exemption. This would impose additional costs that the Department would not face in the baseline condition. These additional costs (including transporting wastes under NRC manifest) would subtract from the overall cost savings. EPA does not expect that these costs would be greater than the cost savings expected.

Overall, DOE has stored or expects to generate more than 3,141,700 cubic feet of low-level mixed waste over the next five years[28]. EPA is unable to estimate how much more of that waste might be disposed under this exemption, or whether DOE would choose to take advantage of the exemption at all. The assumptions listed in section 3.3 are particularly important for DOE wastes, especially regarding the States adopting this regulation and the facilities' choosing to accept exempted wastes.

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[27] "Responses to Comments Raised During March 11, 1997 Conference Call," memo from James V. Antizzo, Office of Technical Services, Office of Waste Management, Environmental Management, dated 23 May 1997. This memo is a follow up to the DOE notebook report, "Background Information Supporting the Department of Energy's Regulatory Reform Activities: Immobilized Mixed Debris and Vitrified Mixed Waste Technical data Proposals, Cost Savings Information and other materials," dated June, 1996.

[28] Department of Energy, Sandia National Laboratories, "Analysis of the Technical Capabilities of DOE Sites for Disposal of Residuals from the Treatment of Mixed Low Level Waste," April 1997.